

The applicant has received the office action of December 8, 2005 wherein the office rejected claims 1, 3-13, 16 and 20 as being unpatentable over Takabashi 5,136,681 and claims 2, 14, 15 and 17 over Takabashi 5,136,681 in view of Snow et al. 5,039,193

As the applicants' attorney believed, based on the office comments on page 5 paragraph 2 of the office action of December 8, 2005, that the office was incorrectly concluding that the Takabashi patent 5,136,681 had two optical fibers in his optical connector plug 31 and was using such finding to reject the claims. The applicants' attorney found only one optical fiber and no optical joints in the optical connector plug 31 of Takabashi patent 5,136,681.

Applicants' attorney placed a call to Examiner Dupuis who called applicant back on February 27, 2006 to discuss what is shown in optical plug 31 of Takabashi patent 5,136,681. After review, examiner Dupuis agreed with applicants' attorney that only one optical fiber is located in optical plug 31 and referred to column 4 lines 44-48 which supports the position that there is only one optical fiber in optical fiber plug 31.

Accordingly, the applicant hereby responds to the office action of December 8, 2005 based on the common understanding of February 27, 2006, namely, that the Takabashi patent 5,136,681 has only one optical fiber in each of his connector plugs 31 and 32.

In regard to the terminology in the present application, the applicant has used the term "optical coupler" to refer to members 10 and 30 (see Figure 3 and page 8 lines 6-8) and the term "alignment sleeve 25" (see Figure 3) to refer to the unit that connects the two optical couplers together so that the optical signal can be sent from one optical coupler to another optical coupler. The exploded and unconnected view of the optical couplers 10 and 30 and the alignment sleeve 25 is shown in Figure 3 and the assembled view of the optical couplers 10 and 30 and the alignment sleeve 25 is shown in Figure 4.

A reference to claim 1 shows it is only directed to the "optical coupler" for example, optical coupler 10 or 30 and that the claim calls for optical coupler to contain two optical fibers, which are rotatable mounted with respect to each other. In addition, the claim calls for transfer of an optical signal between the first optical fiber and the further optical fiber. Features not found in Takabashi patent 5,136,681 optical plug 31 or 32 since he has only a single optical fiber in his optical plug 31 or his optical plug 32.

Applicants' claim 1 and dependent claims thereto are directed to two fibers in a single optical coupler with a rotating joint in the optical coupler, a feature not shown or suggested by the optical plug 31 or optical plug 32 of the Takabashi patent 5,136,681. Applicant has provided an optical coupler that can be used with an apparatus for optical coupling and decoupling which allows one to couple and decouple optical leads while preventing twists or kinks in the optical leads, a feature also not taught by Takabashi 5,136,681.

Applicants independent claim 11 is similarly directed to a first optical fiber with a rotation joint located on the first optical fiber as well as an angle cut on one end of the optical fiber which can be mated with angle cut of a second optical fiber on a second optical coupler together with the alignment sleeve. Again Takabashi patent 5,136,681 fails to teach the use of a rotating joint in his optical plug 31 or 32.

Applicants' claim 15 is directed to the apparatus for optical coupling and decoupling again with a rotatable optical joint in the optical connector that contains a transparent substance having an index of refraction substantially equal to the index of refraction of the optical fibers.

In regards to independent method claim 16, the claim is directed to forming a twist free optical coupling by forming a rotational butt coupled joint in series with a mating coupling end face.

It is submitted that the art of Takabashi patent 5,136,681 and Snow 5,039,193 fail to disclose the steps of forming a rotatable coupling in a coupler and then forming a second coupling to the end of the optical fiber.

More specifically, as pointed out in the specification in the summary of invention on page 4 lines 15-26 and page 5 lines 1-2 the invention:

"comprises an optical coupling apparatus and a method of optical coupling two optical fibers to each other where at least one of the optical fibers to be connected to another optical fiber is severed before the terminal end of the optical fiber to form two butt connectable severed ends in the severed optical fiber. One of the severed ends is mounted in one end of a rotationally member and the other severed end is mounted in the other end of a rotational member so that when the two rotational members are assembled into a rotational coupler the two severed ends of the severed optical fiber are in optical communication with each other through a rotateable butt connection. To reduce the back reflection between the butt connectable severed ends an optical conductive substance having an index of refraction matching the index of refraction of the optical fibers is placed between the two severed ends of the optical fiber. The severed ends of the optical fiber, which are in a butt connecting condition with respect to each other are thus in a condition to rotate with respect to one another without a degradation of the optical signal therebetween. Thus twist or kinks to the optical fiber are avoided since the rotatable coupling element allows the optical leads to rotate without twisting"

Accordingly, it is submitted that claims 1-20 are in condition for allowance and a notice of allowance is requested.

VERSION OF AMENDMENTS SHOWING MARKINGS

In the Claims

1. (Previously Amended) An optical coupler including:
a first optical fiber; and
a further optical fiber rotatably mounted with respect to the first optical fiber with an end of the first optical fiber positionable proximate an end of the further optical fiber to permit transfer of an optical signal between the first optical fiber and the further optical fiber while permitting rotation thereof.
2. (Original) The optical coupler of claim 1 wherein an optical conducting substance having an index of refraction matching an index of refraction of the first optical fiber and the further optical fiber is located proximate the end of the first optical fiber and the end of the further optical fiber.
3. (Original) The optical coupler of claim 1 including an alignment sleeve mounted on the optical coupler.
4. (Original) The optical coupler of claim 3 including a second optical coupler mounted in the alignment sleeve.
5. (Original) The optical coupler of claim 1 including an alignment guide thereon.
6. (Previously Amended) The optical coupler of claim 1 including a flanged member holding the first optical fiber and a rotatable member comprises a further flanged member holding the further optical fiber.

7. (Original) The optical coupler of claim 6 wherein a U-shaped member holds the flanged member and the further flanged member in rotational engagement with each other.
8. (Original) The optical coupler of claim 1 wherein at least one of the optical fibers includes an angle cut face.
9. (Original) The optical coupler of claim 1 wherein the end of the first optical fiber and the end of the further optical fiber form a butt connection.
10. (Original) The optical coupler of claim 1 wherein the further optical fiber includes an angle cut face.
11. (Previously Amended) An apparatus for optical coupling and optical decoupling comprising:
 - a first optical fiber having an angle cut terminus;
 - a rotational joint located on the first optical fiber;
 - a second optical fiber having an angle cut terminus with the angle cut terminus of the first optical fiber and the angle cut terminus of second optical fiber positionable in optically transmittable condition with each other to minimize back reflections; and
 - an alignment sleeve for holding the angle cut terminus of the first optical fiber and the angle cut terminus of the second optical fiber in rotational alignment with respect to each other.
12. (Original) The apparatus of claim 11 with the rotational joint having a member with an alignment guide thereon.
13. (Original) The apparatus of claim 11 wherein the first optical fiber includes a butt connectable end in the rotational joint on the first optical fiber.

14. (Previously Amended) The apparatus of claim 13 wherein an optically conducting substance having an index of refraction matching an index of refraction of the first optical fiber proximate the butt connectable end in the rotational joint.

15. (Original) An apparatus for optical coupling and decoupling comprising:

a first optical lead having a butt connectable end;

a first member holding the first optical lead;

a second optical lead having a butt connectable end;

a second member holding the butt connectable end of the second optical lead in rotational relationship with respect to the butt connectable end of the first optical lead;

the second optical lead having an angle cut end face to allow passage of an optical signal through the angle cut end face; and

a transparent substance extending between the butt connectable end of the first optical lead and the butt connectable end of the second optical lead with the transparent substance having an index of refraction substantially equal to an index of refraction of the first optical lead and the second optical lead to thereby inhibit loss of an optical signal therebetween while permitting rotation thereof.

16. (Original) A method of twist free optical coupling comprising:

forming a rotational butt coupled joint in an optical lead having a terminus;

forming a coupling angle cut face on the terminus of the optical lead;

forming a mating coupling angle cut face on the terminus of another optical lead; and

rotationally aligning the coupling angle cut face on the terminus of the optical lead with the mating coupling angle cut face to thereby transmit an optical signal therebetween while minimizing back reflection and twisting of the optical lead.

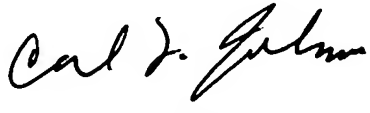
17. (Original) The method of claim 16 including the step of placing an optically conducting substance having an index of refraction matching an index of refraction of the optical leads in the butt coupled joint.

18. (Original) The method of claim 16 including the step of using an alignment sleeve to rotationally align the coupling angle cut face and the mating coupling angle cut face.

19. (Original) The method of claim 18 including the step of using an alignment guide in cooperation with the alignment sleeve to align the coupling angle cut face and the mating coupling angle cut face.

20. (Previously Amended) The method of claim 19 including the step of placing a rotational joint in another optical lead.

Respectfully submitted,
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